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Abstract

CONTAMINATION OF OCEANS BY LONG-LIVED ISOTOPES ACCORDING TO DATA OBTAINED BY SOVIET INVESTIGATIONS

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The report contains a review of data on the contents of strontium - 90 in the waters of the Pacific, Atlantic and Indian oceans and Cezium - 137 in the waters of the Atlantic ocean obtained by Soviet scientists in the period 1959-1963. A short review of the methods used, and the results of the analyses of over 250 samples of ocean water taken from the surface and deep horizons are given.

The results of the analyses of the samples permit to draw the conclusions on the specific features of the process of radioactive contamination in each of the oceans. The contamination of the Pacific is caused by local ingression of a considerable portion of the fission products of nuclear explosions, conducted by the USA and Great Britain, and the global-scale process of radioactive fall-out. The currents existing in the Pacific have created a severe contamination of the north - western area of the Pacific ocean and therefore the USSR and Japan pay special attention to investigations carried out in this area.

The investigations carried out in the central area of the Pacific ocean during the period when there was a "lull" in nuclear testing show that the globular fall-out acts here along with dispersion of the local repository from the zones of the test sites.

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The investigations carried out in this area may give especially valuable information for solving the problem of subaqueous burial of radioactive wastes in the ocean.

The nature of the contamination of the Indian, and expecially the Atlantic oceans by strontium - 90 differs from the picture visualized in the Pacific ocean. The main source of this isotope here is the global radioactive fall-out. Based on data obtained from a series of cruises, a number of interdependencies are coming to light characterizing the distribution of strontium - 90 in the surface waters.

The dependency of the strontium - 90 concentration on the latitude and on oceanic currents is noted in particular, and a hypothesis is suggested in that the contents of strontium-90 in the surface layer of the ocean indicate not the total deposits, but the rate of fall-out of this radioactive nuclide.

Several depth cross-sections have been plotted, showing the contents of strontium - 90 in the various horizons. The analysis of the data obtained allows to strengthen the arguments in favour of the assumption that for the penetration of strontium - 90 into the depths is responsible not only the turbulent diffusion, but also the transfer of water masses in the process of circulation.

Based on results obtained, an estimation was made of the amount of strontium - 90 stored in some ocean areas. This estimation shows that the deposits per unit surface of ocean exceeds the quantity of strontium - 90 that has fallen out along the same latitudes per unit of surface of the dry land. This summary indicates the necessity of studying the specific features in the process of fall-out of radioactive products on sea surfaces compared with the processes, that regulate the fall-out on the dry-land surface.

The report contains the first Soviet data on contents of cesium - 137 in ocean waters.